

## 3. TRANSURANIC WASTE

### 3.1 INTRODUCTION

This chapter presents information on the inventories and characteristics of transuranic (TRU) waste (TRUW) at various DOE TRUW sites in the United States. TRUW is a waste category specific to DOE; it does not apply to wastes regulated by the U.S. Nuclear Regulatory Commission. DOE Order 5820.2A, *Radioactive Waste Management*, defines TRUW as waste that (1) is contaminated with alpha-emitting TRU radionuclides (i.e., those with atomic numbers greater than 92) with half-lives greater than 20 years and (2) contains a total concentration of such radionuclides in excess of 100 nCi/g of waste at the time of assay.<sup>1</sup>

DOE Order 5820.2A also states that heads of field elements can determine that other alpha-contaminated waste at the site(s) may be managed as TRUW.<sup>1</sup> As a consequence of this provision, wastes containing radionuclides, such as <sup>233</sup>U, <sup>241</sup>Pu, and <sup>244</sup>Cm, which do not meet the strict definition of TRU radionuclides because of their respective atomic numbers or half-lives, may be managed as TRUW at some sites.

Most TRUW exists in solid form (e.g., items such as protective clothing, paper, rags, glass, miscellaneous tools, and equipment that have become contaminated with TRU radionuclides).<sup>2</sup> Some TRUW is in the form of sludges or liquids resulting from chemical processing for recovery of plutonium or other TRU elements.<sup>2</sup> Some of the liquids have been solidified, and some sludges have been dewatered. All sludge and liquid wastes scheduled for disposal in the Waste Isolation Pilot Plant (WIPP) will be solidified (before the wastes are shipped) to meet the current WIPP waste acceptance criteria (WAC).<sup>3</sup>

Before 1970, TRUW was disposed of on-site in shallow, landfill-type, DOE-owned burial sites. TRUW disposed of in this manner is referred to as “buried” TRUW. In 1970, DOE’s predecessor agency, the U.S. Atomic Energy Commission, concluded that waste containing long-lived alpha-emitting radionuclides should have greater confinement from the environment. Thus, TRUW generated since the early 1970s has been segregated from other waste types and placed in retrievable storage pending shipment and final disposal in a permanent

geologic repository.<sup>4</sup> This waste is referred to as “retrievably stored” TRUW.

Retrievably stored waste is contained in a variety of packagings (e.g., metal drums and wooden and metal boxes) and is stored in various facilities such as earth-mounded berms, concrete culverts, and buildings and on outdoor pads. Many of these facilities have been upgraded and now comply with applicable hazardous waste storage regulations.

TRUW packages are classified as either “contact handled” (CH) or “remote handled” (RH), depending on the radiation level at the surface of the package at the time of packaging. If this level equals or exceeds 200 mrem/h, the package is classified as RH TRUW.

CH TRUW contains relatively small quantities of fission and activation products that produce highly penetrating radiation; typically, TRUW emissions consist mostly of alpha particles and some neutrons and primarily low-energy gamma and X-rays. RH TRUW typically contains a greater amount of fission and activation products that produce highly penetrating radiation and produce a higher level of radiation at the surface of the package.

TRUW which contains, in addition to radioactive constituents, hazardous constituents defined and regulated according to the Resource Conservation and Recovery Act (RCRA) is defined as mixed TRUW. Examples of mixed TRUW are radionuclide-contaminated sludges from plutonium recovery, discarded materials contaminated with both solvents and radioactive materials, scintillation fluids, and discarded contaminated lead shielding. Mixed TRUW must be managed to comply with both the applicable hazardous waste regulations (e.g., RCRA) and the regulations applying only to radioactive TRUW.

Some TRUW may also be contaminated with hazardous materials defined by regulations other than RCRA (e.g., Toxic Substances Control Act and state regulations). Once identified, DOE continues to manage these wastes appropriately to meet all other hazardous waste regulations in addition to RCRA (if applicable).

Under existing arrangements, retrievably stored TRUW is the responsibility of the DOE Office of Waste Management (EM-30). It is planned that the retrievably

stored TRUW and newly generated TRUW from routine site operational activities will be shipped to WIPP for disposal; whereas, buried TRUW and TRUW generated from site remediation activities and decontamination and decommissioning (D&D) activities are the responsibility of the Office of Environmental Restoration (EM-40). (See Chapter 6 of this document for a discussion of environmental restoration wastes.)

## 3.2 TRUW INVENTORIES

### 3.2.1 Sources of Data

The vast majority of the quantitative information contained in this chapter is either derived or summarized from data furnished by the DOE sites in response to a data call in January 1996 and subsequently updated in May 1997.<sup>5</sup> The update in May 1997 requested the sites to provide the actual amounts of TRUW generated during fiscal year (FY) 1996, and this new information was added to the end of calendar year (EOCY) 1995 stored waste volumes provided by the sites in response to the January 1996 data call. The radionuclide data for the stored waste inventory have not been updated since the data were received in response to the January 1996 data call. Therefore, as discussed later, the radionuclide inventory is based on the stored TRUW inventory at EOCY 1995 that was provided in response to the January 1996 data call. In addition, the May 1997 data update request also required the sites to update the information for TRU-contaminated soil volumes stored at the sites based on the most recent estimates available at the site. As programs and plans evolve or are changed, modifications or additions will be made to the data and other information presented in this chapter. It is expected that the quality and accuracy of the data will continue to improve with each annual revision of this document, thus improving the usefulness of the data for program planning and decision-making.

Early TRUW inventory practices were not as stringent as are current practices regarding requirements for waste identification, categorization, and segregation. Consequently, early inventory data are based largely on process knowledge and on various studies and summaries related to site-specific practices.<sup>6</sup> As these efforts continue and TRUW is further characterized, there will be revisions in the estimated overall quantities of TRUW.

### 3.2.2 Site Locations—Summarized Volumes and Radioactivity

TRUW management activities (generation, retrievable storage, etc.) are performed at 10 major sites and 17 small-quantity sites (SQS). Figure 3.1 shows the locations of the

DOE's TRUW sites. Tables 3.1–3.14, which are discussed later in this chapter, summarize the distribution of TRUW, TRU-contaminated soils, and their associated radioactivities at various DOE TRUW sites. The volumes reported in this document reflect two waste conditions: as-generated and final form. For stored waste, the as-generated volumes reflect the waste volumes currently in storage at the site; whereas, for projected waste, the as-generated volumes reflect the expected waste volumes at the time of generation. The final-form volumes reflect the expected volume of the waste following site processing, treatment, and repackaging of the as-generated waste for disposal at WIPP.

### 3.2.3 Site Data Submittal Process

The data reported in this document are based on both as-generated and final-form volumes of TRUW and, as mentioned previously, are summarized from data furnished by the DOE sites in response to a data call in January 1996 and subsequently updated in May 1997.<sup>5</sup> The data received from the sites in 1997 included actual volumes of waste generation for FY 1996, and these volumes were used to update the EOCY 1995 waste volumes reported by the sites in response to the January 1996 data call. It should be noted that not all sites provided updated information in 1997. For all sites that did not report any information by the deadline of June 30, 1997, it has been assumed that the data reported in response to the January 1996 are still valid.

To meet the needs of the Transuranic Waste Baseline Inventory Report (TWBIR), the data in January 1996 were collected at the waste-stream level in both their as-generated and final forms. The data were grouped by similar physical and chemical properties and aggregated to produce estimated total volumes of the waste.

The data reported in the tables in this chapter include both the as-generated and final-form volumes at the end of FY 1996, and the projected increase in these respective volumes from FY 1997 through FY 2033.

### 3.2.4 Volumes and Radioactivities of TRUW at DOE Sites

#### 3.2.4.1 As-generated TRUW volumes

Table 3.1 shows the total estimated *as-generated* TRUW volumes in storage at the end of FY 1996 and projected through FY 2033 for each DOE site, and Tables 3.2–3.3 show the breakup of this total *as-generated* inventory into mixed and nonmixed CH TRUW (Table 3.2) and mixed and nonmixed RH TRUW (Table 3.3).

#### 3.2.4.2 Final-form TRUW volumes

Table 3.4 shows the *expected final-form volumes* of the stored and projected TRUW reported earlier in Table 3.1 *after the waste is processed to its final form*. Tables 3.5–3.6 show the breakup of this expected final-form volume into mixed and nonmixed CH TRUW (Table 3.5), and mixed and nonmixed RH TRUW (Table 3.6).

Tables 3.7 and 3.8 show the expected total final-form volumes of TRUW at each site distributed among each final waste form (e.g., combustible waste). Table 3.7 shows the final waste form distribution for the major sites, whereas Table 3.8 presents the same for the SQS.

### **3.2.4.3 Decayed radioactivities for retrievably stored TRUW**

The yearly undecayed activity reported for each radionuclide by each TRUW site for CH TRUW and RH TRUW generated from 1970 through 1995 was decayed to the EOCY 1996 using the ORNL computer code ORIGEN2.<sup>7</sup> This code converts the annual as-stored radioactivities to annual decayed radioactivities and accumulates these quantities to produce tables showing cumulative decayed activity for each radionuclide at each site. Once the decayed activities were calculated, the decayed mass was estimated using standard values of the specific activity of each radionuclide as reported in Appendix B of Rev. 12 of the IDB document. Waste volumes are assumed to be unaffected by radioactive decay.

Tables 3.9–3.12 show the distribution of the primary TRUW radionuclides for all the DOE sites (decayed to the EOCY 1996) for retrievably stored CH TRUW and RH TRUW both by radioactivity and by mass. As shown in these tables, <sup>238</sup>Pu, <sup>239</sup>Pu, <sup>240</sup>Pu, <sup>241</sup>Pu, <sup>242</sup>Pu, and <sup>243</sup>Am cumulatively contribute more than 99% of the total activity for retrievably stored CH TRUW (Table 3.9), whereas <sup>232</sup>Th, <sup>235</sup>U, <sup>238</sup>U, <sup>239</sup>Pu, and <sup>240</sup>Pu contribute more than 98% of the total radionuclide mass for retrievably stored CH TRUW (Table 3.10). Similar information on RH TRUW and on the relative distribution of both the radioactivity and mass of the primary radionuclides for the various DOE sites can be derived from Tables 3.11 and 3.12.

In this report, primary radionuclides are those that cumulatively contribute 98% of either the total radionuclide activity or mass.

### **3.2.4.4 Buried TRUW volumes and radioactivities**

Table 3.13 summarizes the buried TRUW volumes and associated radioactivity, both as-stored and as-decayed. Buried TRUW volumes and radioactivities shown in Table 3.13 are unchanged from Rev. 12 of the IDB report because, as discussed above, no further wastes are being buried. Table 3.13 shows both cumulative as-

stored and as-decayed radioactivities for all nuclides, as well as for TRU nuclides only.

### **3.2.4.5 Contaminated soil volumes and radioactivities**

Over the years, many of the older buried waste containers have developed leaks and contaminated the adjacent soil. Also, at some sites, soil has become contaminated by liquid spills or has been used as an ion-exchange medium for dilute liquid waste streams. It is difficult to make accurate estimates of the actual quantity of the contaminated soil. The data shown in Table 3.14 are based on previous data and the updates received from the sites in 1997. Additional characterization efforts will be required to reduce the uncertainties of this data.

## **3.3 PROJECTED FUTURE QUANTITIES OF TRUW**

Tables 3.1–3.6 show the estimated future volumes of TRUW generation. Tables 3.1–3.3 give projections for as-generated waste forms and Tables 3.4–3.6 give projections for final waste forms. The sites were not requested to estimate the radioactivities or isotopic compositions of these wastes because it was believed that there would, in most instances, be little basis for such estimates. The

estimated volumes are given as the total cumulative volume expected to be generated from the start of FY 1997 to the end of the FY 2033.

### **3.4 TRUW DISPOSAL**

The goals of the DOE TRUW Program are to terminate interim storage and achieve permanent disposal of DOE TRUW.<sup>8</sup> As stated in Pub. L. 96-164,<sup>9</sup> WIPP was to be constructed "... as a defense activity of the DOE for the purpose of providing a research and development facility to demonstrate the safe disposal of radioactive waste resulting from defense activities and programs of the United States." Construction of the facility is complete, and WIPP is now the only facility specifically designed for isolation of TRUW.

In 1992, the WIPP Legislative Land Withdrawal Act<sup>10</sup> was passed, confirming congressional intent to have DOE continue with development and permitting of the facility. Since then, DOE has stated its intent to accelerate processes leading to the start of waste disposal operations at the WIPP. As specified in the WIPP Land Withdrawal Act, the facility will contain about 175,000 m<sup>3</sup> (6.2 million ft<sup>3</sup>) of TRUW 650 m below ground in a mined salt formation. Waste received

at WIPP will meet the WIPP Waste Acceptance Criteria<sup>3</sup> and its associated quality assurance requirements.

Also, certification and permit requirements are being completed before DOE begins disposal operations of mixed TRUW at the facility. DOE is committed to demonstrating compliance with all applicable regulations before the permanent disposal of TRUW in the WIPP repository. Therefore, compliance with the requirements contained in the environmental standards for management and disposal of mixed TRUW, as mandated in 40 CFR Part 191<sup>11</sup> and the RCRA regulations, are being documented. Following the criteria for compliance with 40 CFR 191 contained in 40 CFR 194,<sup>12</sup> the DOE has prepared and submitted to the EPA an application, titled 40 CFR Part 191, *Compliance Certification Application for the Waste Isolation Pilot Plant*.<sup>13</sup> This application requests certification from the EPA for the WIPP facility. In addition, the DOE has also submitted a RCRA Part B Permit Application<sup>14</sup> to the state of New Mexico to acquire a permit for the disposal of TRUW containing RCRA-regulated wastes at the WIPP facility. Upon receipt of the EPA certification and the RCRA Part B permit, the WIPP facility will begin disposal of TRUW in May 1998.

### **3.5 REFERENCES**

1. U.S. Department of Energy, *Radioactive Waste Management*, DOE Order 5820.2A, Washington, D.C. (Sept. 26, 1988).
2. U.S. Department of Energy, *Transuranic Waste Baseline Inventory Report*, CAO-95-1121, Revision 3, Carlsbad, New Mexico (June 1996).
3. U.S. Department of Energy, *Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, DOE/WIPP-069, Rev. 5, Carlsbad, New Mexico (April 1996).
4. K. S. Hollingsworth, *Policy Statement Regarding Solid Waste Burial*, AEC Directive IAD No. 0511-21, Washington, D.C. (Mar. 20, 1970).
5. U.S. Department of Energy, Carlsbad Area Office, *Transuranic Waste Data Update for Revision 13 of the Integrated Data Base*, CAO:NTP:RAS 97-1151, Carlsbad, New Mexico (May 23, 1997).
6. U.S. Department of Energy, *Defense Waste Management Plan for Buried Transuranic-Contaminated Waste, Transuranic-Contaminated Soil, and Difficult-to-Certify Transuranic Waste*, DOE/DP-0044, Washington, D.C. (June 1987).
7. Croff, A.G., 1983, "ORIGEN2: A Versatile Computer Code for Calculating the Nuclide Compositions and Characteristics of Nuclear Materials," *Nuclear Technology*, **62**, 335-352 (November 1983).
8. U.S. Department of Energy, *Long Range Master Plan for Defense Transuranic Waste Program*, DOE/WIPP 88-028, Carlsbad, New Mexico (December 1988).

9. U.S. Congress, *Department of Energy National Security and Military Application of Nuclear Energy Authorization Act of 1980*, Pub. L. 96-164 (1980).
10. U.S. Congress, *Waste Isolation Pilot Plant Land Withdrawal Act*, Pub. L. 102-579 (1992).
11. U.S. Environmental Protection Agency, *Environmental Radiation Protection Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes, Final Rule*, 40 CFR Part 191, *Fed. Regist.* **58**, 66398 (Dec. 20, 1993).
12. U.S. Environmental Protection Agency, *Criteria for Certification and Re-Certification of the Waste Isolation Pilot Plant's Compliance with 40 CFR 191 Disposal Regulations, Final Rule*, 40 CFR Part 194, *Fed. Regist.* **61**, 5224 (Feb. 9, 1996).
13. U.S. Department of Energy, *Title 40 CFR Part 191 Compliance Certification Application for the Waste Isolation Pilot Plant*, DOE/CAO-96-2184 (October 1996).
14. U.S. Department of Energy, *Resource Conservation and Recovery Act Part B Permit Application for the Waste Isolation Pilot Plant, Carlsbad, New Mexico*, DOE/WIPP-91-005, Rev. 6 (October 1996).

**Table 3.1. Summary of as-generated waste-form volumes (m<sup>3</sup>) of retrievably stored and projected TRUW  
(mixed and nonmixed CH and RH TRUW)**

Sites	CH TRUW			RH TRUW			Grand total at end of FY 2033
	Stored at end of FY 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	Stored of FY at end 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	
<i>Major sites</i>							
ANL-E	80.6	166.9	247.5	0.0	0.0	0.0	247.5
Hanford	11,008.0	6,270.0	17,278.0	203.0	1,660.0	1,863.0	19,140.9
INEEL	64,760.2	550.0	65,310.2	62.0	0.0	62.0	65,372.2
LANL	8,610.1	6,218.6	14,828.7	93.2	33.8	127.0	14,955.7
LLNL	239.6	645.6	885.1	0.0	0.0	0.0	885.1
Mound	235.8	18.0	253.8	0.0	0.0	0.0	253.8
NTS	618.2	8.0	626.2	0.0	0.0	0.0	626.2
ORNL	921.1	370.0	1,291.1	1,283.0	200.0	1,483.0	2,774.1
RFETS	1,889.2	3,218.1	5,107.2	0.0	0.0	0.0	5,107.2
SRS	6,033.5	8,348.7	14,382.3	0.57	0.0	0.57	14,382.8
Subtotal	94,396.2	25,813.9	120,210.0	1,641.7	1,893.8	3,535.5	123,745.6
<i>Small-quantity sites</i>							
Ames	0.00	1.25	1.25	0.00	0.00	0.00	1.25
ANL-W	6.99	40.69	47.68	22.09	21.69	43.78	91.46
ARCO	0.04	0.03	0.07	0.00	0.00	0.00	0.07
BAPL	0.00	123.06	123.06	0.00	1.56	1.56	124.62
BCL	0.00	0.00	0.00	0.00	368.75	368.75	368.75
ETEC	1.68	0.00	1.68	5.40	0.50	5.90	7.58
KAPL	0.00	0.00	0.00	3.14	1.00	4.14	4.14
LBNL	0.87	1.04	1.91	0.00	0.00	0.00	1.91
MURR	0.21	0.62	0.83	0.00	0.00	0.00	0.83
PAD	4.08	0.00	4.08	0.00	0.00	0.00	4.08
PANT	0.62	0.00	0.62	0.00	0.00	0.00	0.62
SNL/NM	8.23	3.75	11.98	0.00	0.00	0.00	11.98
TBE	0.21	0.00	0.21	0.00	0.00	0.00	0.21
USAMC	2.50	0.00	2.50	0.00	0.00	0.00	2.50
Subtotal	25.43	170.44	195.87	30.63	393.50	424.13	620.00
<i>Commercial site</i>							
WVDP	37.41	143.64	181.05	483.63	28.56	512.19	693.27
Grand total	94,459.0	26,128.0	120,586.9	2,156.0	2,315.9	4,471.8	125,058.9

**Table 3.2. Summary of as-generated waste-form volumes (m<sup>3</sup>) of retrievably stored and projected CH TRUW  
(mixed and nonmixed CH TRUW)**

Sites	Mixed CH TRUW			Nonmixed CH TRUW			Grand total at end of FY 2033
	Stored at end of FY 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	Stored of FY at end 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	
<i>Major sites</i>							
ANL-E	1.1	1.6	2.6	79.6	165.4	244.9	247.5
Hanford	216.1	2,064.8	2,280.9	10,791.9	4,205.2	14,997.1	17,278.0
INEEL	63,291.0	550.0	63,841.0	1,469.2	0.0	1,469.2	65,310.2
LANL	8,178.8	3,295.5	11,474.2	431.3	2,923.1	3,354.5	14,828.7
LLNL	9.4	66.7	76.1	230.2	578.9	809.1	885.1
Mound	2.1	0.0	2.1	233.7	18.0	251.7	253.8
NTS	609.1	8.0	617.1	9.1	0.0	9.1	626.2
ORNL	602.9	296.0	898.9	318.2	74.0	392.2	1,291.1
RFETS	932.4	188.3	1,120.7	956.8	3,029.8	3,986.5	5,107.2
SRS	3,441.6	1,151.1	4,592.8	2,591.9	7,197.6	9,789.5	14,382.3
Subtotal	77,284.4	7,621.9	84,906.3	17,111.8	18,191.9	35,303.6	120,210.0
<i>Small-quantity sites</i>							
Ames	0.00	1.25	1.25	0.00	0.00	0.00	1.25
ANL-W	4.70	0.94	5.64	2.29	39.75	42.04	47.68
ARCO	0.00	0.00	0.00	0.04	0.03	0.07	0.07
BAPL	0.00	0.00	0.00	0.00	123.06	123.06	123.06
BCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETEC	0.84	0.00	0.84	0.84	0.00	0.84	1.68
KAPL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LBNL	0.00	0.00	0.00	0.87	1.04	1.91	1.91
MURR	0.21	0.62	0.83	0.00	0.00	0.00	0.83
PAD	4.08	0.00	4.08	0.00	0.00	0.00	4.08
PANT	0.00	0.00	0.00	0.62	0.00	0.62	0.62
SNL/NM	0.00	0.00	0.00	8.23	3.75	11.98	11.98
TBE	0.00	0.00	0.00	0.21	0.00	0.21	0.21
USAMC	0.00	0.00	0.00	2.50	0.00	2.50	2.50
Subtotal	9.83	2.81	12.64	167.63	183.23	195.87	
<i>Commercial site</i>							
WVDP	5.54	0.00	51.87	143.64	175.51	181.05	
Grand total	77,299.8	7,624.7	84,924.5	17,159.3	18,503.2	35,662.3	120,586.8

**Table 3.3. Summary of as-generated waste-form volumes (m<sup>3</sup>) of retrievably stored and projected RH TRUW  
(mixed and nonmixed RH TRUW)**

Sites	Mixed RH TRUW			Nonmixed RH TRUW			Grand total at end of FY 2033
	Stored at end of FY 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	Stored of FY at end 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	
<i>Major sites</i>							
ANL-E	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hanford	2.6	1,545.0	1,547.6	200.3	115.0	315.3	1,863.0
INEEL	13.3	0.0	13.3	48.7	0.0	48.7	62.0
LANL	93.2	33.8	127.0	0.0	0.0	0.0	127.0
LLNL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mound	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORNL	883.2	55.7	938.9	399.8	144.3	544.1	1,483.0
RFETS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SRS	0.0	0.0	0.0	0.6	0.0	0.6	0.6
Subtotal	992.4	1,634.5	2,626.9	649.4	259.3	908.7	3,535.6
<i>Small-quantity sites</i>							
Ames	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANL-W	15.87	11.79	27.66	6.22	9.90	16.12	43.78
ARCO	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BAPL	0.00	0.00	0.00	0.00	1.56	1.56	1.56
BCL	0.00	0.00	0.00	0.00	368.75	368.75	368.75
ETEC	5.40	0.50	5.90	0.00	0.00	0.00	5.90
KAPL	0.00	0.18	0.18	3.14	0.82	3.96	4.14
LBNL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MURR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SNL/NM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
USAMC	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	21.27	12.47	33.74	9.36	381.03	390.39	424.13
<i>Commercial site</i>							
WVDP	17.76	0.0	17.76	465.87	28.56	494.43	512.19
Grand total	1,031.4	1,647.0	2,678.4	1,124.6	668.9	1,793.5	4,471.9

**Table 3.4. Summary of final waste-form volumes (m<sup>3</sup>) of retrievably stored and projected TRUW  
(mixed and nonmixed CH and RH TRUW)**

Sites	CH TRUW			RH TRUW			Grand total at end of FY 2033
	Stored at end of FY 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	Stored of FY at end 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	
<i>Major sites</i>							
ANL-E	80.6	166.9	247.5	0.0	0.0	0.0	247.5
Hanford	11,007.8	6,270.0	17,277.8	203.0	1,660.0	1,863.0	19,140.7
INEEL	35,979.7	550.0	36,529.7	159.6	0.0	159.6	36,689.3
LANL	8,610.1	6,218.6	14,828.7	93.2	33.8	127.0	14,955.7
LLNL	239.6	645.6	885.1	0.0	0.0	0.0	885.1
Mound	235.8	22.7	258.4	0.0	0.0	0.0	258.4
NTS	618.2	8.0	626.2	0.0	0.0	0.0	626.2
ORNL	460.6	185.0	645.6	1,385.4	115.0	1,500.4	2,146.0
RFETS	6,060.5	3,218.1	9,278.6	0.0	0.0	0.0	9,278.6
SRS	2,220.3	2,640.4	4,860.6	0.9	0.0	0.9	4,861.5
Subtotal	65,513.1	19,925.2	85,438.3	1,842.0	1,808.8	3,650.9	89,089.2
<i>Small-quantity sites</i>							
Ames	0.00	1.25	1.25	0.00	0.00	0.0	1.25
ANL-W	6.99	45.50	52.49	22.09	22.10	44.19	96.68
ARCO	0.21	0.42	0.63	0.00	0.00	0.00	0.63
BAPL	0.00	123.06	123.06	0.00	2.22	2.22	125.28
BCL	0.00	0.00	0.00	0.00	368.75	368.75	368.75
ETEC	1.68	0.00	1.68	5.40	0.50	5.90	7.58
KAPL	23.90	10.40	34.30	0.00	0.00	0.00	34.30
LBNL	0.87	1.04	1.91	0.00	0.00	0.00	1.91
MURR	0.21	0.62	0.83	0.00	0.00	0.00	0.83
PAD	4.08	0.00	4.08	0.00	0.00	0.00	4.08
PANT	0.62	0.00	0.62	0.00	0.00	0.00	0.62
SNL/NM	8.23	3.75	11.98	0.00	0.00	0.00	11.98
TBE	0.21	0.00	0.21	0.00	0.00	0.00	0.21
USAMC	2.50	0.00	2.50	0.00	0.00	0.00	2.50
Subtotal	49.50	186.04	235.54	27.49	393.57	421.06	656.60
<i>Commercial site</i>							
WVDP	37.41	143.64	181.05	483.63	28.56	512.19	693.27
Grand total	65,600.0	20,254.9	85,854.9	2,353.1	2,230.9	4,584.2	90,439.1

**Table 3.5. Summary of final waste-form volumes (m<sup>3</sup>) of retrievably stored and projected CH TRUW  
(mixed and nonmixed CH TRUW)**

Sites	Mixed CH TRUW			Nonmixed CH TRUW			Grand total at end of FY 2033
	Stored at end of FY 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	Stored of FY at end 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	
<i>Major sites</i>							
ANL-E	1.1	1.6	2.6	79.6	165.4	244.9	247.5
Hanford	215.9	2,064.8	2,280.7	10,791.9	4,205.2	14,997.1	17,277.8
INEEL	35,123.2	550.0	35,673.2	856.5	0.0	856.5	36,529.7
LANL	8,178.8	3,295.5	11,474.2	431.3	2,923.1	3,354.5	14,828.7
LLNL	9.4	66.7	76.1	230.2	578.9	809.1	885.1
Mound	2.1	0.0	2.1	233.7	22.7	256.4	258.4
NTS	609.1	8.0	617.1	9.1	0.0	9.1	626.2
ORNL	301.5	148.0	449.5	159.1	37.0	196.1	645.6
RFETS	3,139.7	188.3	3,328.0	2,920.9	3,029.8	5,950.6	9,278.6
SRS	1,567.6	506.7	2,074.2	652.7	2,133.7	2,786.4	4,860.6
Subtotal	49,148.2	6,829.4	55,977.6	16,364.9	13,095.7	29,460.5	85,438.3
<i>Small-quantity sites</i>							
Ames	0.00	1.25	1.25	0.00	0.00	0.00	1.25
ANL-W	4.70	1.04	5.74	2.29	44.46	46.75	52.49
ARCO	0.00	0.00	0.00	0.21	0.42	0.63	0.63
BAPL	0.00	0.00	0.00	0.00	123.06	123.06	123.06
BCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETEC	0.84	0.00	0.84	0.84	0.00	0.84	1.68
KAPL	0.00	1.87	1.87	23.90	8.53	32.43	34.30
LBNL	0.00	0.00	0.00	0.87	1.04	1.91	1.91
MURR	0.21	0.62	0.83	0.00	0.00	0.00	0.83
PAD	4.08	0.00	4.08	0.00	0.00	0.00	4.08
PANT	0.00	0.00	0.00	0.62	0.00	0.62	0.62
SNL/NM	0.00	0.00	0.00	8.23	3.75	11.98	11.98
TBE	0.00	0.00	0.00	0.21	0.00	0.21	0.21
USAMC	0.00	0.00	0.00	2.50	0.00	2.50	2.50
Subtotal	9.83	4.78	14.61	39.67	181.26	220.93	235.54
<i>Commercial site</i>							
WVDP	5.54	0.00	5.54	31.87	143.64	175.51	181.05
Grand total	49,163.6	6,834.2	55,997.8	16,436.4	13,420.6	29,857.0	85,854.9

**Table 3.6. Summary of final waste-form volumes (m<sup>3</sup>) of retrievably stored and projected RH TRUW  
(mixed and nonmixed RH TRUW)**

Sites	Mixed RH TRUW			Nonmixed RH TRUW			Grand total at end of FY 2033
	Stored at end of FY 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	Stored of FY at end 1996	Projected waste during FY 1997–2033	Total at end of FY 2033	
<i>Major sites</i>							
ANL-E	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hanford	2.6	1,545.0	1,547.6	200.3	115.0	315.3	1,863.0
INEEL	30.3	0.0	30.3	129.4	0.0	129.4	159.6
LANL	93.2	33.8	127.0	0.0	0.0	0.0	127.0
LLNL	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mound	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORNL	1,185.5	42.9	1,228.4	199.9	72.2	272.1	1,500.4
RFETS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SRS	0.0	0.0	0.0	0.9	0.0	0.9	0.9
Subtotal	1,311.6	1,621.7	2,933.3	530.5	187.2	717.7	3,650.9
<i>Small-quantity sites</i>							
Ames	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANL-W	15.87	12.07	27.94	6.22	10.03	16.25	44.19
ARCO	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BAPL	0.00	0.00	0.00	0.00	2.22	2.22	2.22
BCL	0.00	0.00	0.00	0.00	368.75	368.75	368.75
ETEC	5.40	0.50	5.90	0.00	0.00	0.00	5.90
KAPL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LBNL	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MURR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PANT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SNL/NM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TBE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
USAMC	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	21.27	12.57	33.84	6.22	381.00	387.22	421.06
<i>Commercial site</i>							
WVDP	17.76	0.00	17.76	465.87	28.56	494.43	512.19
Grand total	1,350.6	1,634.3	2,984.9	1,002.6	596.8	1,599.4	4,584.3

**Table 3.7. Estimated final waste-form volume (m<sup>3</sup>) composition of retrievably stored and projected TRUW for major sites**

Major sites	Category	Contact-handled			Remote-handled		
		Stored	Projected	Total	Stored	Projected	Total
ANL-E	Heterogeneous	64.38	165.15	229.53	0.00	0.00	0.00
	Lead/cadmium metal waste <sup>a</sup>	0.63	0.21	0.84	0.00	0.00	0.00
	Solidified inorganics	15.19	1.28	16.47	0.00	0.00	0.00
	Solidified organics	0.21	0.07	0.28	0.00	0.00	0.00
	Uncategorized metal	0.21	0.21	0.42	0.00	0.00	0.00
	Subtotal	80.62	166.92	247.54	0.00	0.00	0.00
Hanford	Combustible	268.14	1,567.50	1,835.64	0.35	0.00	0.35
	Heterogeneous	10,472.15	3,762.60	14,234.75	200.31	829.00	1,029.31
	Inorganic nonmetal	25.92	0.00	25.92	0.00	0.00	0.00
	Lead/cadmium metal waste <sup>a</sup>	2.94	0.00	2.94	2.32	831.00	833.32
	Soils	83.95	0.00	83.95	0.00	0.00	0.00
	Solidified inorganics	0.41	0.00	0.41	0.00	0.00	0.00
	Solidified organics	2.40	0.00	2.40	0.00	0.00	0.00
	Uncategorized metal	134.49	939.90	1,074.39	0.00	0.00	0.00
	Unknown	17.35	0.00	17.35	0.00	0.00	0.00
	Subtotal	11,007.75	6,270.00	17,277.75	202.98	1,660.00	1,862.98
INEEL	Combustible	90.52	0.00	90.52	0.00	0.00	0.00
	Filter	260.97	0.00	260.97	0.00	0.00	0.00
	Graphite	204.16	0.00	204.16	0.00	0.00	0.00
	Heterogeneous	57.45	0.00	57.45	83.36	0.00	83.36
	Inorganic nonmetal	163.88	0.00	163.88	0.30	0.00	0.30
	Lead/cadmium metal waste <sup>a</sup>	3,105.50	0.00	3,105.50	0.00	0.00	0.00
	Salt waste	4.66	0.00	4.66	0.00	0.00	0.00
	Solidified inorganics	2,252.71	0.00	2,252.71	7.12	0.00	7.12
	Solidified organics	12.93	0.00	12.93	0.00	0.00	0.00
	Uncategorized metal	248.01	0.00	248.01	0.00	0.00	0.00
	Vitrified	29,578.91	550.00	30,128.91	0.00	0.00	0.00
	Unknown	0.00	0.00	0.00	68.83	0.00	68.83
	Subtotal	35,979.70	550.00	36,529.70	159.61	0.00	159.61
LANL	Combustible	1,997.28	3,404.18	5,401.46	0.00	0.00	0.00
	Filter	0.00	166.28	166.28	0.00	0.00	0.00
	Heterogeneous	1,615.37	20.64	1,636.01	93.20	33.82	127.02
	Inorganic nonmetal	100.01	125.20	225.21	0.00	0.00	0.00
	Salt	119.16	38.92	158.08	0.00	0.00	0.00
	Soils	107.89	0.00	107.89	0.00	0.00	0.00
	Solidified inorganics	2,184.40	304.80	2,489.20	0.00	0.00	0.00
	Solidified organics	6.14	662.87	669.01	0.00	0.00	0.00
	Uncategorized metals	2,479.84	1,495.70	3,975.54	0.00	0.00	0.00
	Subtotal	8,610.09	6,218.59	14,828.68	93.20	33.82	127.02

**Table 3.7** (continued)

Major sites	Category	Contact-handled			Remote-handled		
		Stored	Projected	Total	Stored	Projected	Total
LLNL	Combustible	56.79	407.89	464.67	0.00	0.00	0.00
	Filter	17.58	42.66	60.24	0.00	0.00	0.00
	Salt waste	0.73	3.85	4.58	0.00	0.00	0.00
	Solidified inorganics	14.56	7.70	22.26	0.00	0.00	0.00
	Solidified organics	1.46	7.70	9.15	0.00	0.00	0.00
	Uncategorized metal	148.47	175.77	324.24	0.00	0.00	0.00
	Subtotal	239.58	645.56	885.14	0.00	0.00	0.00
Mound	Combustible	7.49	0.00	7.49	0.00	0.00	0.00
	Filter	0.83	0.00	0.83	0.00	0.00	0.00
	Heterogeneous	0.62	0.00	0.62	0.00	0.00	0.00
	Soils	106.88	0.00	106.88	0.00	0.00	0.00
	Solidified inorganics	1.25	0.00	1.25	0.00	0.00	0.00
	Uncategorized metal	63.74	22.68	86.42	0.00	0.00	0.00
	Unknown	54.95	0.00	54.95	0.00	0.00	0.00
	Subtotal	235.76	22.68	258.44	0.00	0.00	0.00
NTS	Heterogeneous	617.35	8.00	625.35	0.00	0.00	0.00
	Unknown	0.83	0.00	0.83	0.00	0.00	0.00
	Subtotal	618.18	8.00	626.18	0.00	0.00	0.00
ORNL	Heterogeneous	460.55	185.00	645.55	269.55	92.50	362.05
	Solidified inorganics	0.00	0.00	0.00	1,115.85	22.50	1,138.35
	Subtotal	460.55	185.00	645.55	1,385.40	115.00	1,500.40
	Subtotal	460.55	185.00	645.55	1,385.40	115.00	1,500.40
RFETS	Combustible	1,336.65	1,878.12	3,214.77	0.00	0.00	0.00
	Filter	691.38	26.55	717.93	0.00	0.00	0.00
	Graphite	378.86	0.00	378.86	0.00	0.00	0.00
	Heterogeneous	4.58	0.00	4.58	0.00	0.00	0.00
	Inorganic nonmetal	1,868.20	4.20	1,872.40	0.00	0.00	0.00
	Lead/cadmium metal waste <sup>a</sup>	5.63	23.38	29.01	0.00	0.00	0.00
	Salt waste	1,190.90	0.00	1,190.90	0.00	0.00	0.00
	Solidified inorganics	169.31	0.00	169.31	0.00	0.00	0.00
	Solidified organics	114.46	21.00	135.46	0.00	0.00	0.00
	Uncategorized metal	300.57	1,264.80	1,565.37	0.00	0.00	0.00
	Subtotal	6,060.54	3,218.05	9,278.59	0.00	0.00	0.00
SRS	Heterogeneous	1,714.87	1,838.17	3,553.04	0.89	0.00	0.89
	Inorganic nonmetal	0.10	0.00	0.10	0.00	0.00	0.00
	Uncategorized metal	112.92	473.57	586.49	0.00	0.00	0.00
	Vitrified	392.38	328.63	721.01	0.00	0.00	0.00
	Subtotal	2,220.27	2,640.37	4,860.64	0.89	0.00	0.89
Total (major sites)		65,513.03	19,925.17	85,438.20	1,842.08	1,808.82	3,650.90

<sup>a</sup>Lead/cadmium metal wastes include materials that contain either lead or cadmium or both.

**Table 3.8. Estimated final waste-form volume (m<sup>3</sup>) composition of retrievably stored and projected TRUW for small-quantity and commercial sites**

Major sites	Category	Contact-handled			Remote-handled		
		Stored	Projected	Total	Stored	Projected	Total
<i>Small-quantity sites (SQS)</i>							
Ames	Solidified inorganics	0.00	1.25	1.25	0.00	0.00	0.00
ANL-W	Combustible	0.00	6.80	6.80	0.00	0.00	0.00
	Heterogeneous	6.99	22.20	29.19	1.60	21.25	22.85
	Uncategorized metal	0.00	16.50	16.50	20.49	0.85	21.34
	Subtotal	6.99	45.50	52.49	22.09	22.10	44.19
ARCO	Heterogeneous	0.21	0.42	0.63	0.00	0.00	0.00
BAPL	Heterogeneous	0.00	0.00	0.00	0.00	2.22	2.22
	Inorganic nonmetal	0.00	0.21	0.21	0.00	0.00	0.00
	Uncategorized metal	0.00	122.85	122.85	0.00	0.00	0.00
	Subtotal	0.00	123.06	123.06	0.00	2.22	2.22
BCL	Heterogeneous	0.00	0.00	0.00	0.00	368.75	368.75
ETEC	Heterogeneous	1.68	0.00	1.68	0.00	0.00	0.00
	Lead/cadmium metal waste <sup>a</sup>	0.00	0.00	0.00	5.40	0.50	5.90
	Subtotal	1.68	0.00	1.68	5.40	0.50	5.90
KAPL	Heterogeneous	23.90	10.40	34.30	0.00	0.00	0.00
LBNL	Heterogeneous	0.87	1.04	1.91	0.00	0.00	0.00
MURR	Heterogeneous	0.21	0.62	0.83	0.00	0.00	0.00
PAD	Solidified inorganics	4.08	0.00	4.08	0.00	0.00	0.00
PANT	Heterogeneous	0.62	0.00	0.62	0.00	0.00	0.00
SNL/NM	Heterogeneous	8.23	3.75	11.98	0.00	0.00	0.00
TBE	Inorganic nonmetal	0.21	0.00	0.21	0.00	0.00	0.00
USAMC	Heterogeneous	2.50	0.00	2.50	0.00	0.00	0.00
	SQS subtotal	49.50	186.04	235.54	27.49	393.57	421.06

**Table 3.8** (continued)

Major sites	Category	Contact-handled			Remote-handled		
		Stored	Projected	Total	Stored	Projected	Total
<i>Commercial site</i>							
WVDP	Filter 0.00	0.00	0.00	48.71	28.56	77.27	
	Heterogeneous	18.36	143.64	162.00	18.42	0.00	18.42
	Lead/cadmium metal waste <sup>a</sup>	3.03	0.00	3.03	0.00	0.00	0.00
	Solidified inorganics	5.20	0.00	5.20	0.00	0.00	0.00
	Uncategorized metal	0.42	0.00	0.42	416.50	0.00	416.50
	Unknown	10.40	0.00	10.40	0.00	0.00	0.00
	Commercial site subtotal	37.41	143.64	181.05	483.63	28.56	512.19
	Grand total	86.91	329.68	416.59	511.12	422.13	933.25

<sup>a</sup>Lead/cadmium metal wastes include materials that contain either lead or cadmium or both.

**Table 3.9. Summary of decayed radioactivity (Ci) isotopic content of retrievably stored CH TRU<sup>a</sup>**

Site	<sup>238</sup> Pu	<sup>239</sup> Pu	<sup>240</sup> Pu	<sup>241</sup> Pu	<sup>241</sup> A <sub>m</sub>	Total curies	Curies (%)
<i>Major sites</i>							
ANL-E	2.14E+00	3.28E+01	9.42E+00	5.98E+01	5.73E+00	1.10E+02	0.00
Hanford	8.03E+04	2.76E+04	6.27E+03	9.18E+04	3.54E+03	2.10E+05	8.31
INEEL	5.93E+04	4.01E+04	9.82E+03	1.38E+05	9.01E+04	3.37E+05	13.39
LANL	1.27E+05	3.47E+04	8.62E+03	9.72E+04	1.71E+04	2.85E+05	11.29
LLNL	1.06E+02	1.80E+02	7.17E+01	1.74E+03	1.68E+02	2.27E+03	0.09
Mound	1.53E+03	2.98E+01	0.00E+00	0.00E+00	0.00E+00	1.56E+03	0.06
NTS	1.14E+02	2.59E+03	1.88E+01	2.26E+02	2.82E+02	3.23E+03	0.13
ORNL	1.62E+03	9.39E+02	9.60E+02	4.57E+04	1.59E+03	5.08E+04	2.02
RFETS	8.42E+03	1.95E+05	4.97E+04	7.43E+05	1.32E+05	1.13E+06	44.75
SRS	4.28E+05	8.21E+03	2.02E+03	4.85E+04	2.93E+03	4.90E+05	19.43
Subtotal	7.06E+05	3.09E+05	7.74E+04	1.17E+06	2.48E+05	2.51E+06	99.47
<i>Small-quantity sites (SQS)</i>							
Ames	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ANL-W	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ARCO	0.00E+00	4.13E-03	0.00E+00	3.70E+02	0.00E+00	3.70E+02	0.01
BCL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
BAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ETEC	7.20E-03	4.70E-02	2.20E-02	6.11E-01	3.19E-02	7.19E-01	0.00
KAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
LBNL	4.70E-05	4.10E-03	1.07E-03	1.13E-07	2.31E-02	2.83E-02	0.00
MURR	0.00E+00	2.48E-02	0.00E+00	0.00E+00	3.32E-01	3.57E-01	0.00
PAD	0.00E+00	2.06E-01	0.00E+00	0.00E+00	8.30E-02	2.89E-01	0.00
PANT	0.00E+00	5.55E-02	0.00E+00	0.00E+00	0.00E+00	5.55E-02	0.00
SNL/NM	2.77E-01	3.96E+00	9.11E-04	0.00E+00	1.17E+00	5.41E+00	0.00
TBE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
USAMC	0.00E+00	1.80E+01	0.00E+00	0.00E+00	0.00E+00	1.80E+01	0.00
Subtotal	2.84E-01	2.23E+01	2.40E-02	3.71E+02	1.64E+00	3.95E+02	0.02

**Table 3.9** (continued)

Site	$^{238}\text{Pu}$	$^{239}\text{Pu}$	$^{240}\text{Pu}$	$^{241}\text{Pu}$	$^{241}\text{Am}$	Total curies	Curies (%)
<i>Commercial site</i>							
WVDP	0.00E+00	0.00E+00	0.00E+00	3.43E+01	2.15E+00	3.65E+01	0.00
Total (all sites)	7.06E+05	3.09E+05	7.74E+04	1.17E+06	2.48E+05	2.51E+06	99.49
Total curies, %	28.03	12.27	3.07	46.28	9.83		
Cumulative, %	28.03	40.30	43.37	89.65	99.49		

<sup>a</sup>Decayed to the end of CY 1996.

**Table 3.10. Summary of decayed mass (g) isotopic content of retrievably stored CH TRUW<sup>a</sup>**

Site	$^{232}\text{Th}$	$^{235}\text{U}$	$^{238}\text{U}$	$^{239}\text{Pu}$	$^{240}\text{Pu}$	Total grams	Grams (%)
<i>Major sites</i>							
ANL-E	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Hanford	5.59E+05	1.61E+05	1.43E+07	4.46E+05	2.76E+04	1.55E+07	56.14
INEEL	3.01E+06	2.88E+04	3.44E+04	6.47E+05	4.33E+04	4.07E+06	14.76
LANL	2.12E+04	4.08E+05	3.09E+06	5.59E+05	3.80E+04	3.75E+06	13.58
LLNL	1.33E-08	2.95E+02	9.67E+04	2.91E+03	3.16E+02	1.00E+05	0.36
Mound	0.00E+00	1.24E-01	0.00E+00	4.81E+02	0.00E+00	4.81E+02	0.00
NTS	9.47E-09	2.62E+01	4.88E+02	4.18E+04	8.28E+01	4.24E+04	0.15
ORNL	7.07E+03	2.90E+03	1.29E+05	1.51E+04	4.23E+03	1.58E+05	0.57
RFETS	2.99E-05	8.36E+02	2.37E-02	3.15E+06	2.19E+05	3.37E+06	12.21
SRS	1.05E+05	1.06E+03	2.73E+03	1.33E+05	8.91E+03	2.50E+05	0.91
Subtotal	3.70E+06	2.36E+05	1.80E+07	4.99E+06	3.41E+05	2.72E+07	98.69
<i>Small-quantity sites (SQS)</i>							
Ames	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ANL-W	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ARCO	0.00E+00	3.76E-06	3.47E-01	6.65E-02	0.00E+00	4.14E-01	0.00
BCL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
BAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ETEC	7.18E-12	1.50E-04	2.91E-08	7.58E-01	9.69E-02	8.55E-01	0.00
KAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
LBNL	1.19E-12	1.87E-06	6.45E-06	6.61E-02	4.70E-03	7.82E-02	0.00
MURR	0.00E+00	3.18E-05	3.60E-01	3.99E-01	0.00E+00	7.59E-01	0.00
PAD	0.00E+00	6.16E-04	0.00E+00	3.32E+00	0.00E+00	3.32E+00	0.00
PANT	0.00E+00	7.59E-05	0.00E+00	8.95E-01	0.00E+00	8.95E-01	0.00
SNL/NM	2.04E-15	1.81E-03	0.00E+00	6.39E+01	4.01E-03	6.39E+01	0.00
TBE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
USAMC	0.00E+00	0.00E+00	0.00E+00	2.90E+02	0.00E+00	2.90E+02	0.00
Subtotal	8.37E-12	2.69E-03	7.07E-01	3.59E+02	1.06E-01	3.60E+02	0.00

**Table 3.10** (continued)

Site	$^{232}\text{Th}$	$^{235}\text{U}$	$^{238}\text{U}$	$^{239}\text{Pu}$	$^{240}\text{Pu}$	Total grams	Grams (%)
<i>Commercial site</i>							
WVDP	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Total (all sites)	3.70E+06	2.36E+05	1.80E+07	5.00E+06	3.41E+05	2.72E+07	98.69
Total grams, %	13.41	0.85	65.08	18.10	1.24		
Cumulative, %	13.41	14.26	79.34	97.44	98.69		

<sup>a</sup>Decayed to the end of CY 1996.

**Table 3.11. Summary of decayed radioactivity (Ci) isotopic content of retrievably stored RH TRUW<sup>a</sup>**

Site	<sup>60</sup> Co	<sup>90</sup> Sr	<sup>90</sup> Y	<sup>137</sup> Cs	<sup>137m</sup> Ba	<sup>152</sup> Eu	<sup>154</sup> Eu	<sup>241</sup> Pu	<sup>244</sup> C <sub>m</sub>	Total curies	Curies (%)
<i>Major sites</i>											
ANL-E	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Hanford	2.97E+02	6.62E+03	6.62E+03	7.68E+03	7.27E+03	0.00E+00	0.00E+00	7.56E+03	0.00E+00	3.60E+04	39.57
INEEL	1.82E+01	1.50E+03	1.50E+03	1.69E+03	1.60E+03	1.87E-02	3.16E-01	5.25E+01	5.56E-02	6.36E+03	6.98
LANL	3.65E+00	2.56E+03	2.56E+03	2.81E+03	2.66E+03	2.75E-04	1.79E-02	6.02E+01	0.00E+00	1.07E+04	11.69
LLNL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Mound	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
NTS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.29E-05	1.49E+02	1.49E+02	0.16
ORNL	2.81E+02	1.31E+04	1.31E+04	2.62E+03	2.48E+03	2.00E+03	9.59E+02	3.26E+01	5.20E+02	3.51E+04	38.52
RFETS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
SRS	0.00E+00	6.69E+00	6.69E+00	6.70E+00	6.34E+00	0.00E+00	0.00E+00	0.00E+00	4.51E+00	3.09E+01	0.03
Subtotal	6.00E+02	2.38E+04	2.38E+04	1.48E+04	1.40E+04	2.00E+03	9.59E+02	7.71E+03	6.74E+02	8.83E+04	96.96
<i>Small-quantity sites (SQS)</i>											
Ames	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ANL-W	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ARCO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
BCL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
BAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ETEC	2.02E+00	2.65E+00	2.65E+00	2.82E+00	2.66E+00	0.00E+00	0.00E+00	4.58E+00	0.00E+00	1.74E+01	0.02
KAPL	1.16E-01	2.97E+01	2.97E+01	2.98E+01	2.81E+01	0.00E+00	6.61E-01	3.68E-01	0.00E+00	1.18E+02	0.13
BNL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
MURR	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
PAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
PANT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
SNL/NM	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
TBE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
USAMC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Subtotal	2.14E+00	3.24E+01	3.24E+01	3.26E+01	3.08E+01	0.00E+00	6.61E-01	4.95E+00	0.00E+00	1.36E+02	0.15

**Table 3.11** (continued)

Site	<sup>60</sup> Co	<sup>90</sup> Sr	<sup>90</sup> Y	<sup>137</sup> Cs	<sup>137m</sup> Ba	<sup>152</sup> Eu	<sup>154</sup> Eu	<sup>241</sup> Pu	<sup>244</sup> C <sub>m</sub>	Total curies	Curies (%)
<i>Commercial site</i>											
WVDP	0.00E+00	1.91E+01	1.91E+01	5.23E+01	4.95E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E+02	0.15
Total (all sites)	6.02E+02	2.38E+04	2.38E+04	1.49E+04	1.41E+04	2.00E+03	9.60E+02	7.71E+03	6.74E+02	8.86E+04	97.27
Total curies, %	0.66	26.17	26.17	16.35	15.47	2.20	1.05	8.46	0.74		
Cumulative, %	0.66	26.83	53.00	69.35	84.82	87.02	88.07	96.53	97.27		

<sup>a</sup>Decayed to the end of CY 1996.

**Table 3.12. Summary of decayed mass (g) isotopic content of retrievably stored RH TRUW<sup>a</sup>**

Site	$^{232}\text{Th}$	$^{233}\text{U}$	$^{235}\text{U}$	$^{238}\text{U}$	$^{239}\text{P}_{\text{u}}$	Total grams	Grams (%)
<i>Major sites</i>							
ANL-E	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Hanford	1.81E+04	4.72E+01	5.99E+04	3.42E+04	6.61E+03	1.19E+05	2.23
INEEL	6.80E+02	2.52E+01	2.36E+03	4.01E+03	4.98E+02	7.57E+03	0.14
LANL	3.15E-08	2.32E-09	3.84E+03	6.82E+00	3.97E+03	7.82E+03	0.15
LLNL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Mound	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
NTS	1.38E-10	1.59E-08	1.82E-02	9.71E-12	3.80E+01	3.80E+01	0.00
ORNL	2.08E+06	3.08E+03	8.08E+03	3.10E+06	4.27E+02	5.19E+06	97.40
RFETS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
SRS	8.96E-15	1.30E-08	5.84E-01	0.00E+00	1.71E-01	7.55E-01	0.00
Subtotal	2.10E+06	3.15E+03	7.42E+04	3.14E+06	1.15E+04	5.33E+06	99.92
<i>Small-quantity sites (SQS)</i>							
Ames	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ANL-W	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ARCO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
BCL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
BAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
ETEC	2.51E-11	3.66E-10	1.07E-03	1.29E-08	9.89E+00	9.89E+00	0.00
KAPL	7.11E-14	1.39E-11	2.02E-06	9.22E-05	2.66E-02	2.67E-02	0.00
LBL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
MURR	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
PAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
PANT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
SNL/NM	0.00E+00	3.17E-10	5.47E-09	0.00E+00	3.23E-05	3.23E-05	0.00
TBE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
USAMC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00
Subtotal	2.52E-11	6.97E-10	1.07E-03	9.22E-05	9.92E+00	9.92E+00	0.00
<i>Commercial site</i>							
WVDP	0.00E+00	3.57E-09	0.00E+00	0.00E+00	0.00E+00	1.98E+01	0.00
Total (all sites)	2.10E+06	3.15E+03	7.42E+04	3.14E+06	1.16E+04	5.33E+06	99.92
Total grams, %	39.38	0.06	1.39	58.88	0.22		
<b>Cumulative, %</b>	<b>39.38</b>	<b>39.44</b>	<b>40.83</b>	<b>97.71</b>	<b>99.92</b>		

<sup>a</sup>Decayed to the end of CY 1996.

**Table 3.13. Summary of buried TRUW volume and radioactivity as of EOCY 1996<sup>a</sup>**

Site	Cumulative volume (m <sup>3</sup> )	Cumulative as-stored radioactivity		Decayed radioactivity	
		All nuclides (10 <sup>3</sup> Ci)	TRU only (10 <sup>3</sup> Ci)	All nuclides (10 <sup>3</sup> Ci)	TRU only (10 <sup>3</sup> Ci)
<i>Major sites</i>					
ANL-E	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hanford <sup>b</sup>	6.36E+04	5.13E+02	2.45E+01	1.07E+02	2.79E+01
INEEL	5.70E+04	2.49E+02	c	c	c
LANL	1.40E+04	d	e	d	d
LLNL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mound	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NTS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ORNL	5.72E+02	f	f	f	f
RFETS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SRS	4.87E+03	3.37E+01	3.37E+01	3.05E+01	3.05E+01
Subtotal	1.40E+05	7.96E+02	5.82E+01	1.38E+02	5.84E+01
<i>Small-quantity sites (SQS)</i>					
Ames	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ANL-W	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARCO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETEC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
KAPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LBNL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MURR	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PANT	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SNL/NM	1.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TBE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
USAMC	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Subtotal	1.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>Commercial site</i>					
WVDP	1.35E+03	6.52E+02	6.52E+02	0.00E+00	0.00E+00
Total	1.41E+05	1.45E+03	7.10E+02	1.38E+02	5.84E+01

<sup>a</sup>Decayed to the end of CY 1996.

<sup>b</sup>Radioactivity data reported by Hanford is decayed to EOCY 1993.

<sup>c</sup>INEEL data did not include any isotopic compositions, so no TRU radionuclide or decay calculations could be made.

<sup>d</sup>Information not available.

<sup>e</sup>An estimate of 9230 Ci was reported for LANL as-stored TRU alpha radioactivity (as of the end of CY 1991) in *Integrated Data Base for 1992: U.S. Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics*, DOE/RW-0006, Rev. 8 (October 1992).

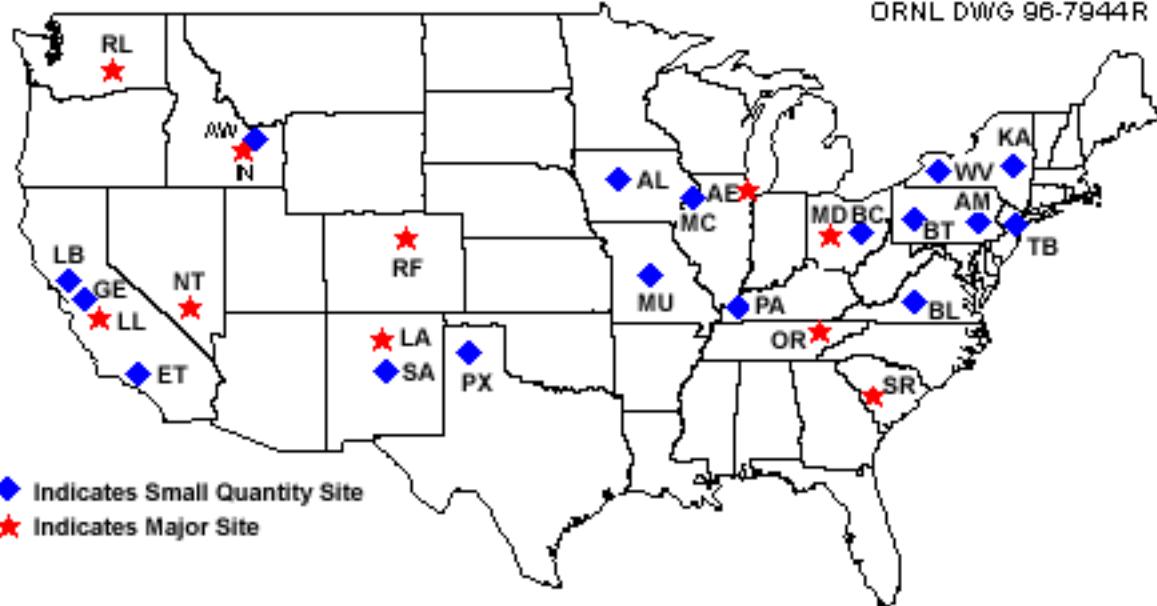
<sup>f</sup>The volume represents only the post-1969 disposal volume. Pre-1970 volumes, associated cumulative activities, and radionuclide compositions are not currently available.

**Table 3.14. Volumes and radioactivities of TRU-contaminated soils<sup>a</sup>**

Site	Soil contaminated with TRUW			
	Solid		Liquid	
	Volume (m <sup>3</sup> )	Radioactivity (Ci)	Volume (m <sup>3</sup> )	Radioactivity (Ci)
<i>Major sites</i>				
ANL-E	0	0	0	0
Hanford	b	b	32,000	b
INEEL	c	c	c	c
LANL	108	257	0	0
LLNL	0	0	0	0
Mound	c	c	c	c
NTS	c	c	c	c
ORNL	c	c	c	c
RFETS	2	40	c	c
SRS	0	0	0	0
<i>Small-quantity sites (SQS)</i>				
Ames	0	0	0	0
ANL-W	0	0	0	0
ARCO	0	0	0	0
BCL	0	0	0	0
BAPL	0	0	0	0
ETEC	0	0	0	0
KAPL	0	0	0	0
LBNL	0	0	0	0
MURR	c	c	c	c
PAD	c	c	c	c
PANT	0	0	0	0
SNL/NM	c	c	c	c
TBE	0	0	0	0
USAMC	c	c	c	c
<i>Commercial site</i>				
WVDP	c	c	c	c

<sup>a</sup>See re<sup>f. 6.</sup><sup>b</sup>Hanford volumes included in buried TRUW. Previous total radioactivity content estimated at about 81,000 Ci. Current TRU radioactivity reported at about 17,000 Ci.<sup>c</sup>Information either not provided or available.

ORNL DWG 96-7944R



◆ Indicates Small Quantity Site

★ Indicates Major Site

AE Argonne National Laboratory-East  
AL Ames Laboratory  
AM ARCO Medical Products Company  
AW Argonne National Laboratory-West  
BC Battelle Columbus Decommissioning Project  
BL Babcock & Wilcox-Lynchburg  
BT Bettis Atomic Power Laboratory  
ET Energy Technology Engineering Center  
GE General Electric Vallecitos Nuclear Center  
IN Idaho National Engineering & Environmental Laboratory  
KA Knolls Atomic Power Laboratory  
LA Los Alamos National Laboratory  
LB Lawrence Berkeley National Laboratory  
LL Lawrence Livermore National Laboratory

MC U.S. Army Material Command  
MD Mound Plant  
MU University of Missouri Research Reactor  
NT Nevada Test Site  
OR Oak Ridge National Laboratory  
PA Paducah Gaseous Diffusion Plant  
PX Pantex Plant  
RF Rocky Flats Environmental Technology Site  
RL Hanford (Richland) Site  
SA Sandia National Laboratories/New Mexico  
SR Savannah River Site  
TB Teledyne Brown Engineering  
WV West Valley Demonstration Project